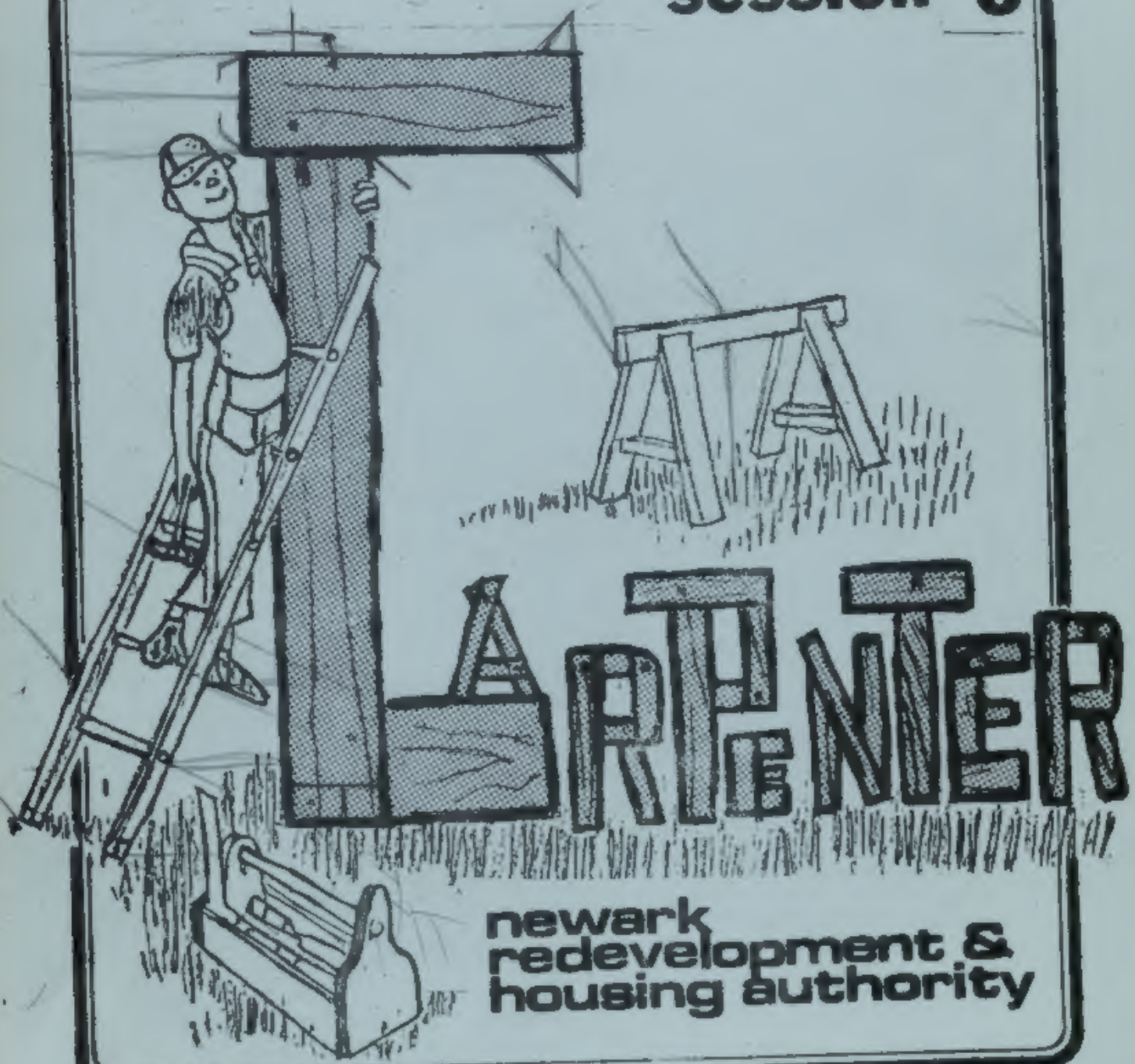
SIMPLE HOME REPAIRS
session 6



CARPENTER

newark
redevelopment &
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HOMEOWNERS TRAINING COURSE

AT

NEWARK REDEVELOPMENT AND HOUSING AUTHORITY

MAINTENANCE TRAINING CENTER

4 Sheffield Drive

Newark, N.J. 07104

Saturday, October 15, 1977

9:00 a.m. - 1:00 p.m.

Instructor: Peter J. Doherty

C A R P E N T R Y

Session #6 — Floor Repairs, Wood, Asphalt Tile and Sheetgoods

A) Wood Flooring

1. Remove damaged wood flooring and all nails.
2. Do not damage any good flooring that is to remain.
3. Clean away all particles of old flooring.
4. Cut and install new flooring by toe-nailing all but last piece of flooring.
5. Last piece of flooring to have bottom edge of groove cut off.
6. Install surface, nail, set nails and putty holes.
7. Refinish with correct coating.

B) Asphalt Tile and Sheetgoods.

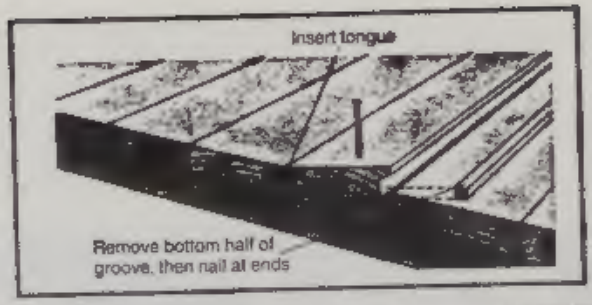
1. Remove damaged or worn asphalt tiles or cut out section of sheetgood (linoleum).
2. Scrape and clean surface thoroughly.
3. Select correct amount and type of asphalt tile or cut to size proper sheetgoods.
4. Apply proper cement to area being repaired.
5. Allow to dry according to instructions.
6. Install asphalt tile or sheetgoods and press firmly in place.

Floors

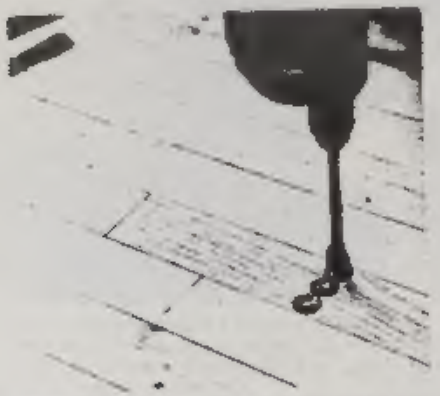
Replacing damaged floorboards

There are many reasons for removing an old section of flooring and replacing it with new. A section may be damaged, or you may have to cut out a sound section to get at defective wiring or plumbing underneath. No matter what your reason may be, the method of replacement is always the same.

Bore a series of overlapping holes across the center of the damaged piece, taking care not to go too far into the subflooring. If there is no subflooring, center the holes over the joists to give support to the replacement. Either chisel off the tongue to get the section out or split it down the middle. Square off jagged edges of holes.



Cut the piece of new flooring to length for a snug fit. It will not go down into the opening, however, until the lower half of its groove is removed. Coat tongue and groove with glue. Insert the replacement tongue in the old flooring groove and drive the grooved side down into the opening. Drill pilot holes for nails at the ends of the board and along the grooved side of long boards. Drive in cement-coated nails and sink the nailheads.

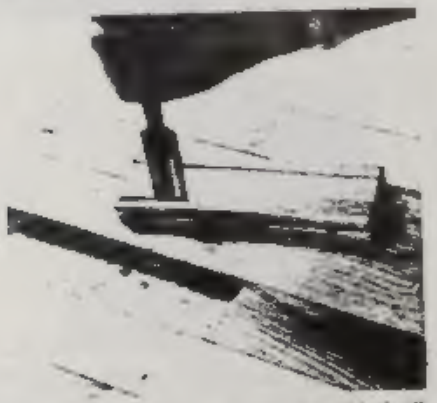


Drill a series of large holes across center and against grain of board to be removed. Avoid drilling too far into the subflooring.

Use a sharp chisel to cut off the tongue of the board being replaced. Remove the board and trim the edges of the opening.

Alternate method of removing board. Split defective board down the center and along the grain with chisel. Pry out pieces.

Measure the opening and cut replacement board to size. Carefully test the new board against the opening for precise fit.



Turn replacement board over and chisel off lower half of its groove so that it will fit over the tongue of the adjoining board.

Coat tongue and groove with glue. Insert tongue, then drive it into place, using a wood block and mallet.

Drill pilot holes for nails at each end of board and along sides of long boards; make holes smaller than nail size. Sink nailheads.

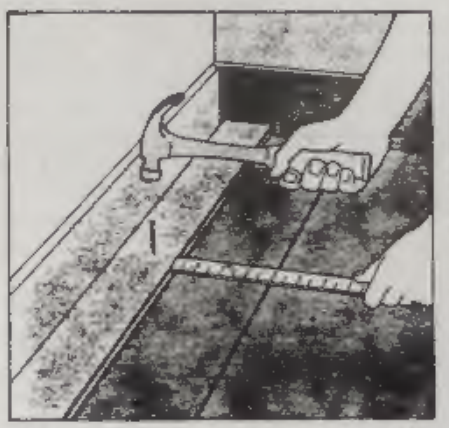
After cement-coated nails have been sunk, fill holes and joints with color-matched putty and refinish to match the adjoining flooring.

Floor coverings

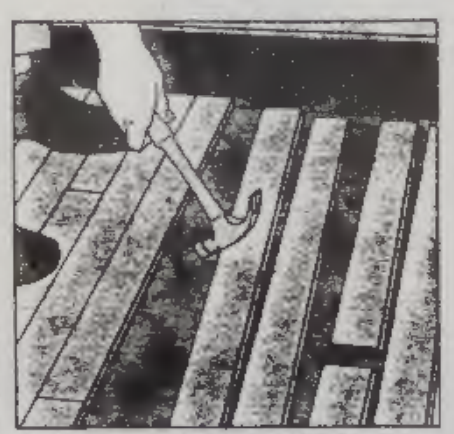
How to lay a wood floor

Wood floors can be secured directly over joists or even concrete. A subfloor is usually used, however, for added strength; many today are of plywood which is nailed across the joists. This is generally covered with a layer of 15-pound asphalt-saturated building felt, lapped 3 inches at seams and held in place by the finish floor.

Tongue-and-groove strip or board flooring—the kind most commonly used—comes prefinished as well as unfinished, and is usually laid the long way of the room. Take care, in laying a wood floor, not to mar the wood with the head of the hammer. Nail into the tongue at a 45-degree angle and into the subfloor. Use 2-2½ inch steel-cut flooring nails, the choice depending upon the thickness of the finish floor. Start the nails on the tongue side approximately where the shoulder of the tongue comes out. To avoid splitting the tongue, use a nail set to drive the last ¼ inch or so. If there is a subfloor, the nails need not go into the joists. Leave a gap of at least ¼ inch at each side of the room.

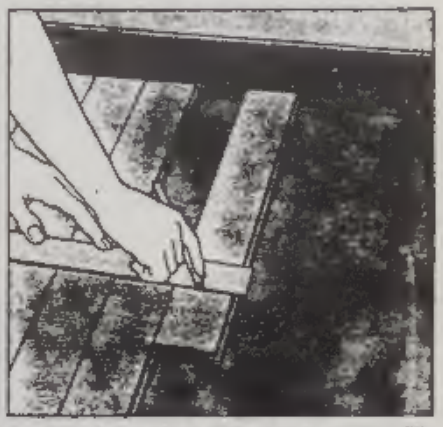


1. Stretch a string across the room as a guide for laying the first course of flooring. Leave a gap of ¼ in. between first course and wall; this will be covered by molding.

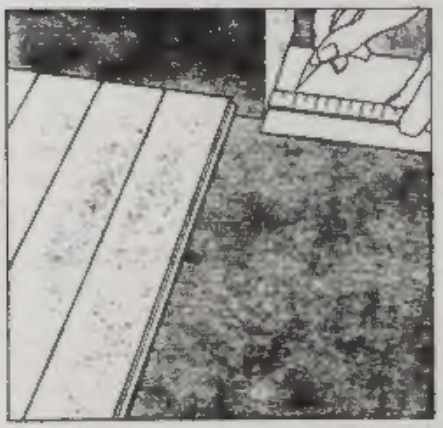


2. For appearance's sake, avoid laying out the floorboards so that too many joints appear in one area. It is best to lay the boards out in a dry run before doing actual nailing.

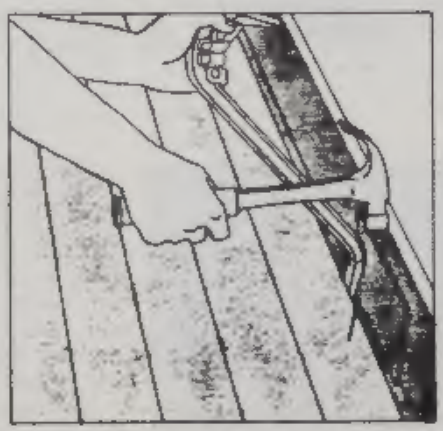
3. Hammer on a piece of scrap to keep the flooring tight. Each tongue-and-groove board is secured to the next one by blind-nailing diagonally through the tongue.



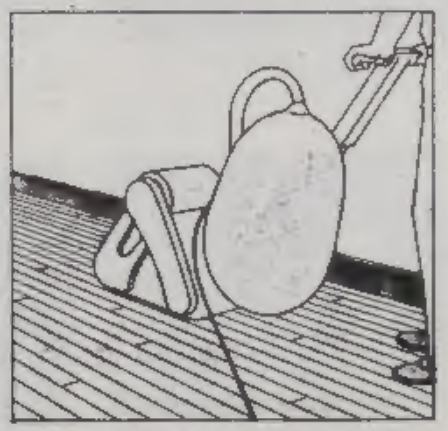
4. Measuring a piece of flooring in order to fill out a course. If the flooring you are using has a tongue on its width, make sure you cut off this end as the waste.



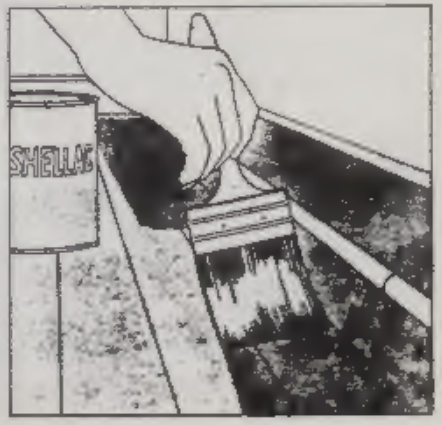
5. To fit flooring around a door frame, make a cardboard pattern to fit around the frame. Then use the cardboard as a template and cut the flooring to fit.



6. Since the last course, and sometimes the one next to it, cannot be blind-nailed, face-nail them in place. Pull them up tight with a crowbar and sink the nailheads.



7. The finished floor should be given at least two sandings, first with coarse sandpaper and then with medium or fine. Turn to page 114 to see how to use a sanding machine.



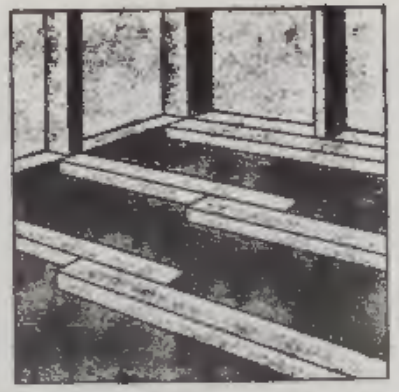
8. The final step consists of applying the baseboard and the shoe molding. Then give the floor two coats of varnish, polyurethane, or shellac. Polish with steel wool and wax.

How to lay a wood floor over concrete

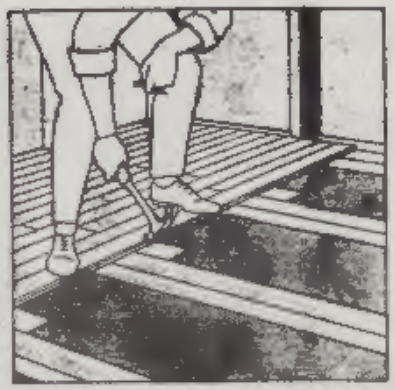
A wood floor can be laid over concrete, using 2 x 4 screeds (short lengths to which flooring can be nailed). Use random lengths 18 to 48 inches long and 2 x 6 or 2 x 8 pieces along the walls. Screeds are set in mastic about ¼ inch thick, which is spread over the whole floor. If adhesive is applied only under the screeds, it is spread ¼ inch thick; compression by the screeds will spread it further.

With this base, only tongue-and-groove flooring should be used. It is best to stack flooring indoors for at least a week before laying; damp flooring can shrink considerably and leave cracks to be filled. Short lengths are usable, but be sure each piece rests on at least two screeds, preferably more. Nail at every point where a screed is crossed by a piece of flooring. Pieces must be nailed into screeds at laps; this ties the substructure together.

Cover entire floor with ⅛-in.-thick coating of mastic. Use a notched trowel.



Lay random length 2 x 4 screeds so that the ends are overlapping.



Lay flooring across the screeds. Nail into the screeds through the tongue.

How to lay a wood block floor

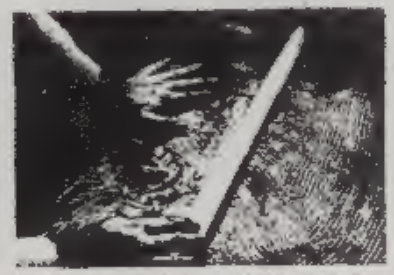
Block, or parquet, flooring may be purchased finished in many sizes and thicknesses. Most parquet is made of oak, but other woods are available. The blocks are usually composed of wood strips glued together into a unit; one type is laminated of layers of wood much the same way as plywood. To give wood flooring time to adjust to atmospheric conditions, it should be unpacked and left in the room where it will be used for at least 72 hours beforehand.

You can install block flooring over most types of subfloor, but for on-grade or below-grade concrete, put down polyethylene film before installing the blocks. Do not lay a wood floor over a subfloor that is damp or subject to moisture.

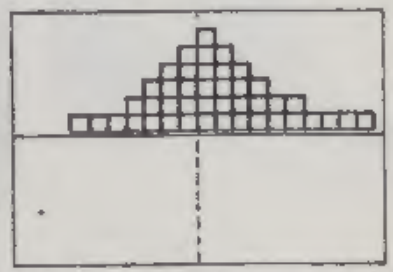
Blocks may be laid either square (parallel to the wall) or diagonally. It is best to have full blocks in the doorway where traffic is concentrated. To accomplish this, start from the center of the wall where the door is located and lay loose blocks to a point about 4 feet into the room. Measure the exact distance from there to the opposite wall. Chalk a line and snap it to mark the center of your starting boundary. Spread the mastic over the part of the marked-off area that is opposite the entranceway.

The first block is located in the right angle at the center point and blocks then laid in a pyramid sequence the same as vinyl tiles ~ . When the main area is completed, lay the rest of the blocks.

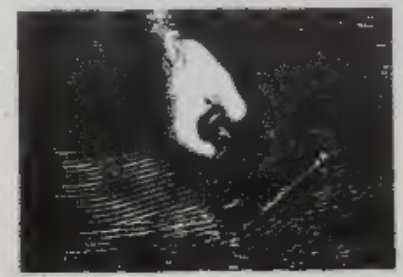
1. If a floor is badly warped or uneven, apply a hardboard underlayment. For tiled floors, remove loose tiles and level spaces with patching cement.



2. For concrete floors, a plastic vapor barrier must be laid first. Dampness from the concrete could cause the floor to warp. Apply adhesive, then roll plastic onto it.

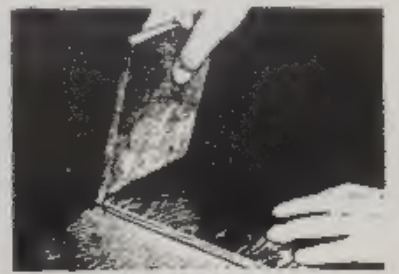


3. Plan to lay the flooring squares in this order, working on half the room at a time. Use a chalk line to mark the room off into square segments.



4. Spread the adhesive with a notched trowel. Hold the trowel at a slight angle so that ridges are left in the adhesive. Coating should be about ⅛ in. thick.

5. Drop the parquet blocks into place with a minimum of sliding. Press the blocks together so that they interlock. Tap the edges to assure a snug fit.



6. Leave at least ½ in. between the wall and the flooring to allow for expansion. The gap will be covered by the molding. Do not nail molding to the floor.

Floors

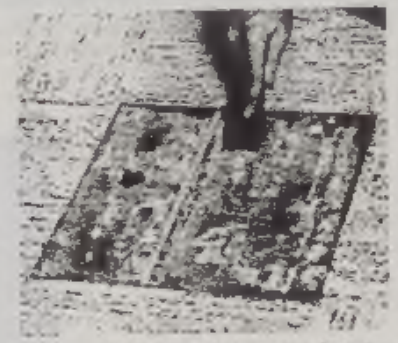
Replacing damaged tiles

The easiest way to remove a tile without damaging those around it is to apply heat from a torch or a warm iron. The warmth will soften the adhesive underneath, permitting the tile to be lifted off. Start lifting at one side or a corner and work toward the center. If this is impractical, you can chisel the tile away, starting from the center and progressing out to the edges. After you have removed the tile, scrape away the old adhesive. Try the new tile in the opening, matching the pattern if necessary. If it does not fit, trim or sand its edges. When the new tile fits exactly, warm it as you did the old one to make it flexible. Then apply adhesive to the area where the new tile will be laid. Install the tile and weight it down until the adhesive sets.

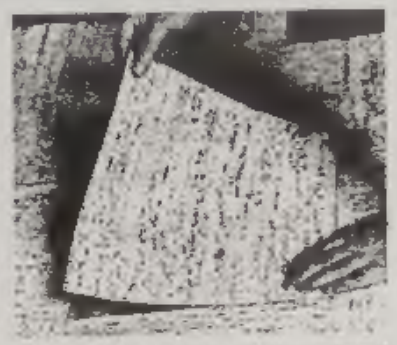
Warm the damaged tile with an iron or a torch; apply just enough heat to soften the adhesive underneath.

Using a putty knife, carefully pry up the damaged tile. Take care not to disturb the surrounding tiles.

An alternate method is to chisel out the damaged tile. Work carefully, from the center to the edges.



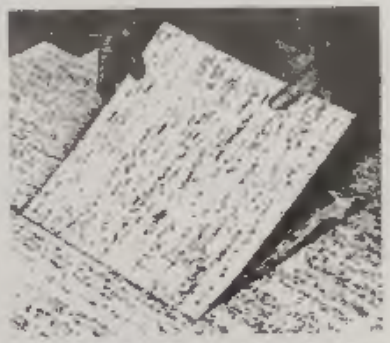
Remove all adhesive that remains from the setting of the old tile, scraping until you reach the bare foundation.



Try new tile in opening, matching pattern if design is involved. Tile sizes are standard so fit should be no problem.

New tile may require slight trimming. If so, use a knife or sandpaper with caution, testing frequently for fit.

Apply the amount and type of adhesive that is recommended for the kind of tile you are using as a replacement.

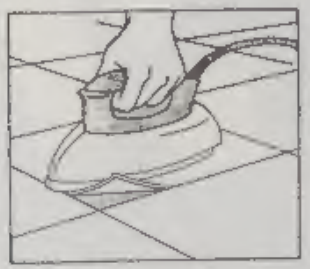


After first warming the new tile with an iron or torch sufficiently to make it flexible, lay it in place.

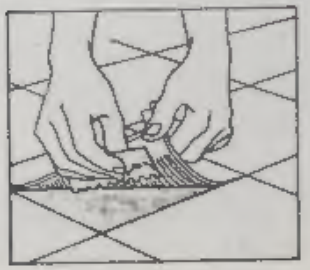
When replacement tile is in position, weight it down. Leave weights in place for the entire drying period.

Flattening curled tiles

The tendency of tiles to curl up at the edges is probably their greatest fault. To cure this, first warm the tile, applying enough heat to soften its adhesive. Then lift the tile high enough to dab a small amount of adhesive under the curled area. Replace the tile and hold it down with weights until the adhesive is dry.



With an electric iron apply moderate heat to curled section of the tile long enough to soften the adhesive underneath.

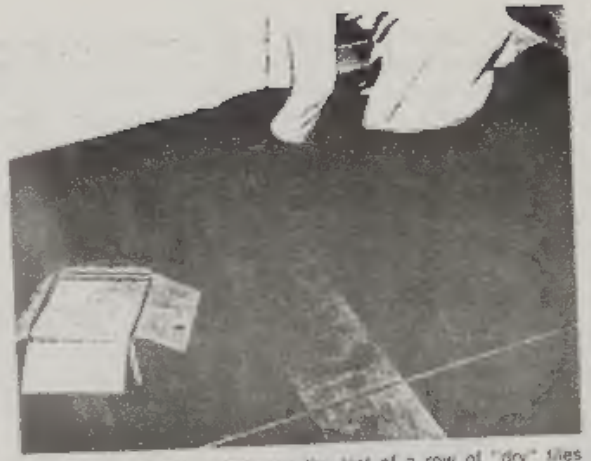


Apply new adhesive as needed to the loose area; replace tile and keep weighted down until adhesive dries.

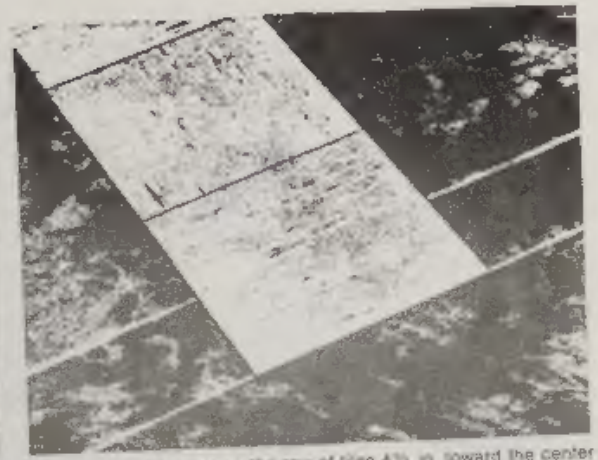
Preparations for resilient floor tiling

For best results, the subfloor should be smooth and dry, free of dust, grease, and wax or other finishing material. On painted floors, paint must adhere tightly, with no cracking or peeling. Old floor coverings, too, must be firmly and evenly attached. Remove any covering except asphalt and vinyl-type tile on subfloors that are on or below grade. On wood floors, replace any badly worn boards and renail loose ones. Cover single-layer or wide board (over 3¼-inch) double flooring with underlayment of plywood or hardboard. Drive all nails flush.

Both brush-on and trowel-type adhesives are good. Professionals prefer the troweled material because they are used to it. The brush-on type is better for the handyman because it avoids the risk of applying too much or too little cement. The tendency of the amateur is to use too much—a real problem with some adhesives, which squeeze up between the tiles. Apply trowel-type adhesive with a notched trowel.



Measure the distance between the last of a row of "dry" tiles and the wall to get border width.



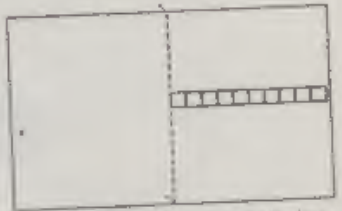
For a wider border, move the row of tiles 4½ in. toward the center of room away from the wall (6 in. for 12-in. tiles).

Snapping a chalk line: On long lengths, press the center of the string on the floor and snap each of the sides in turn.

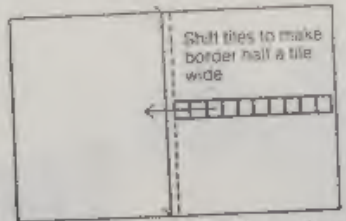
Lining up the tiles

1. Chalk a string slightly longer than room width and tie it between two nails positioned at opposite sides of the room. Nails should extend about an inch above the floor.

2. Make certain that the string is tight so it will snap properly. Raise it a few inches and then let it snap free to mark a chalk line on the floor.



3. Determine center of chalk line; place a line of "dry" tiles from the chalk line to the side wall, lining up the first tile with the chalk line and the center mark.



4. If the gap between wall and closest tile is 3 in. or less (for 9-in. tiles), move row 4½ in. from wall. Set new nails and snap second line.

5. If gap is more than 3 in., leave tiles alone and lay out second row at right angles to first. If gap at end is 3 in. or less, follow step 4.

6. This establishes lines against which to lay the tiles. Leave the nails and string in place temporarily as a guide for laying the tiles.

Floor coverings

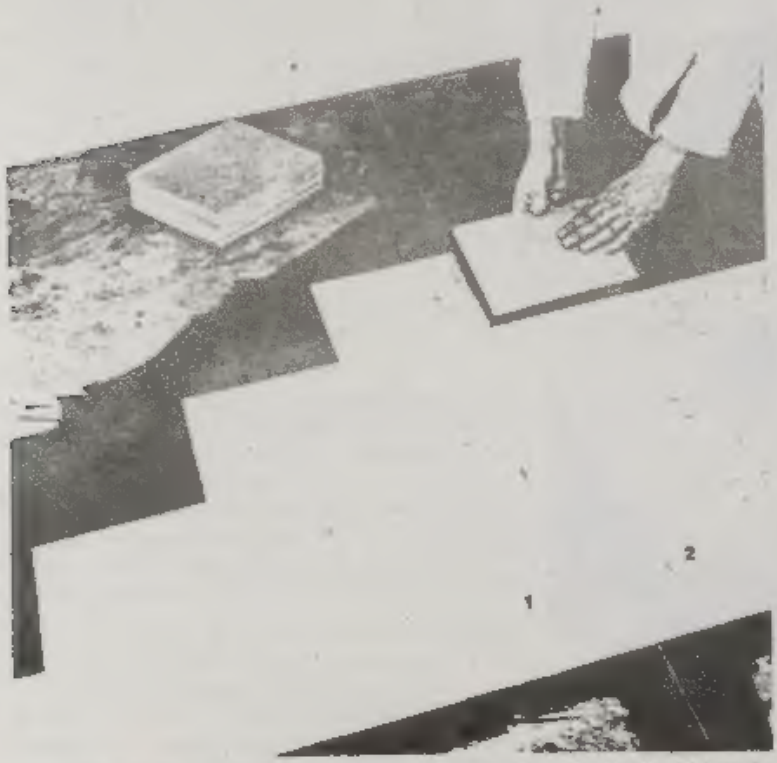
Laying the tiles

Tile half the room at a time, first spreading adhesive over about a square yard of floor on each side of the center line. Place the first two tiles in the right angles made by the chalk lines and work outward from each side to form a pyramid pattern. Lower the tiles into the adhesive—do not slide them into place; this forces the adhesive up. Lay marbleized or grained tile so that the pattern in adjacent tiles runs in opposite directions. Continue spreading adhesive and laying tiles up to the borders.

To cut the border tiles, place a "dry" tile exactly over an adjacent fixed tile; hold another on top, flush with the wall, and score along the inner edge. The trimmed part of this tile will fit the border.

Do the same when cutting a tile to fit against a door frame. First place and mark a tile as though you were cutting it for a straight border. Then move the tile, without turning it, to the other side of the door frame, again place it over a fixed tile, and draw a line at right angles to intersect the first. Cut along the lines up to the intersection with a sharp knife.

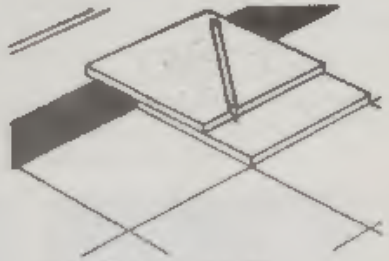
Treat more complicated shapes, such as thresholds, the same way, but take separate measurements from each surface in both tile positions. In the bottom example at the right, the tile is in its first position, and lines are drawn a tile-width away from surfaces A, B, C, and D. If the outline is curved, draw a free-hand line between the marks after marking intersections from the second tile position. Wire solder, bent to fit, can be used to transfer curves.



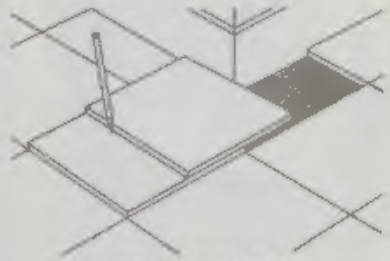
1. Lay the tiles outward to make a pyramid shape, starting with tiles 1 and 2 in the angles made by the lines. Where you can, kneel on the tiles as you work.

2. Butt each tile against the adjacent ones and lower it into place.

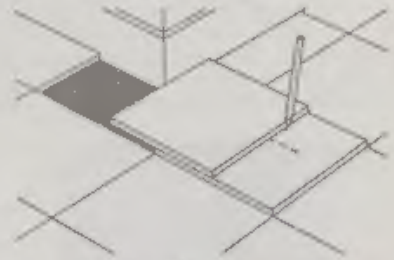
3. Use a knife to scribe border tiles, then bend tile to complete the break.



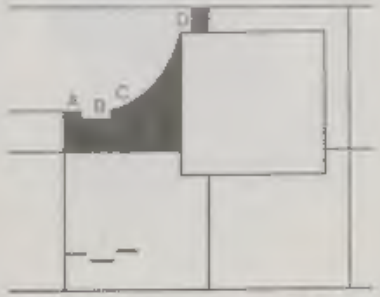
1. Marking for border tile



2. Marking tile for a corner



3. Second marking for corner

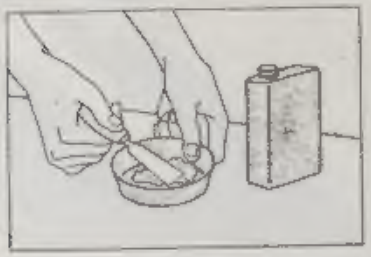


4. Marking tile for irregular shape

Repairing surface defects on tiles

To correct scratches or dents on tiles, scrape some of the surface from a scrap piece of the same material and grind it to a powder. Mix the powder with a colorless lacquer or quick-drying varnish to make a paste. Trowel the paste into the scratched or dented area. When the paste has dried, buff it smooth with fine steel wool and boiled linseed oil.

Take scrapings from a scrap of the same material as the floor covering, convert it to powder, and put in a container.



Add colorless lacquer and mix with the powder to a paste. Apply the paste to the section of the flooring that needs repair.

Removing stains from tiles

If food or grease spilled on resilient flooring is not removed fairly soon, the spill will become a stain. The substance that caused the stain determines the material that will remove it.

The most effective stain removers are everyday items in the average household: Household bleach, white vinegar and water, hydrogen peroxide, rubbing alcohol, household ammonia, lighter fluid, and nail polish remover.

If these are tried in the order given, one of them will eventually solve the problem. In most cases the first one, household bleach, will do the job.

If the stain covers the entire floor, and is somewhat gummy, the cause may be too much wax, or too many coats on top of one another. A strong ammonia solution or commercial cleaner should clear it up.

Patching sheet flooring

Worn sections of sheet flooring, such as linoleum or sheet vinyl, can be patched effectively and with relative ease. Get a piece of the same material as the floor covering to be patched; be sure it is larger than the damaged area. Place it over the worn section, being sure the pattern matches exactly, and tape it in position. Using a linoleum knife or other sharp knife, cut through both old and new thicknesses; extend the patch well beyond the damaged area. Remove both pieces, then thoroughly clean the area that was under the old floor covering. Trial-fit the patch, remove it, and apply adhesive to floor or back of patch. Put the patch in place and weight it down flat until the adhesive has dried.

Place a piece of the same material, larger than the worn area, over the spot to be patched; match the pattern exactly.

Tape patch material over worn area. Cut along steel straightedge through both thicknesses; make patch larger than area.

Remove both the patch and the original flooring material and thoroughly clean surface where the damaged flooring lay.

Check the fit of the patch in the opening. Trim as necessary with sharp knife and sandpaper, checking fit frequently.

Apply floor tile adhesive to the bottom of the patch and install the patch. Wipe up excess adhesive with a cloth.

Fit the replacement patch into position. Weight it down and leave the weights in place until the adhesive has dried.

How to lay sheet vinyl

Standard sheet flooring that is installed permanently with adhesive is not generally recommended as a do-it-yourself material. Loosely laid vinyl flooring, however, is well within a handyman's skills.

Most cushioned vinyls are available in 6-, 9-, and 12-foot widths. Seaming is needed only for rooms that are more than 12 feet wide and is accomplished as follows: To match the pattern across the seam, the second piece of material must be overlapped along the seam edge. Be sure to allow enough material in both width and length to match the pattern. After the pattern is matched, weight or tape the matched pieces so that they will not shift. Cut to fit at the walls, allowing for ⅛-¼ inch clearance at the edges.

Using a metal straightedge as a guide, cut through both pieces of material in the overlapped area with a sharp knife. As you cut, keep the knife vertical, not leaning to the right or left. Remove the cut-off pieces, both top and bottom.

Next lay back one piece of flooring at the seam. Draw a pencil line on the floor along the edge of the second piece. Lay back the second piece and spread a 6-inch band of adhesive under the seam area, centering it on the pencil line. If the back of the vinyl has been waxed, sand the area lightly. Use a vinyl cement recommended by the flooring manufacturer and spread it with a notched trowel. Lay the vinyl sheeting onto the wet adhesive and wipe down with a damp cloth to ensure good contact with the adhesive.

In trimming the vinyl sheeting, allow a minimum clearance gap of ¼ inch between the edge of the material and each wall to provide for expansion and contraction of the underfloor. If molding is used, it will conceal the gap.

Clearance must also be allowed between the vinyl and the floor molding to permit the walls and subfloor to move without affecting the flooring. Removed moldings should be renailed to the baseboard (not the floor), with a piece of cardboard inserted between the molding and the floor. When the cardboard is removed, you will have the proper clearance. If a rubber or vinyl cove base is used, it can be cemented to the wall. Install a metal threshold at doorways, fastening it to the floor but not through the vinyl.

1. To loose-lay sheet vinyl, first remove the wood molding between the baseboard and the floor by prying up gently from the floor and away from the wall.

2. Measure the room where the vinyl is to be installed. Roll the vinyl out in another room and let it reach room temperature. Transfer the measurements to it.

3. Snap a chalk line across the rolled-out vinyl to establish a true edge for one side of the room. Mark as many cutouts as possible—for pipes, radiators, etc.—on the vinyl.

4. Using heavy shears, cut the vinyl on the marked lines. Roll up the material, with the pattern side showing, and carry it to the room where it is to be laid.

5. Start at the longest and most regular wall of the room and butt the sheeting against it. Unroll it across the room, allowing excess material to curve up at other walls.

6. Press the flooring material gently into place and trim excess with a knife or scissors. Allow ⅛ in. for clearance at all walls and other vertical surfaces.

7. At a doorway, it is best to protect the edge of the vinyl with a metal threshold. Screw the threshold to the floor and not through the vinyl. Use roundhead or oval screws.

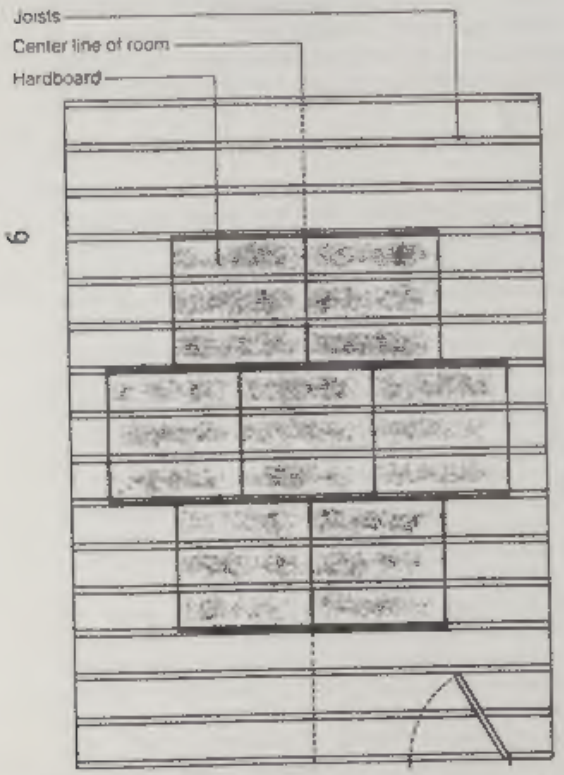
8. The final step is replacing the floor moldings. Slip a piece of cardboard between the molding and the vinyl to provide clearance. After nailing, remove the cardboard.

Installing hardboard underlayment

Badly worn floorboards can be covered with tiles or linoleum. To get good results with either, an underlayment must first be put down over the damaged floorboards. Hardboard is excellent for this purpose.

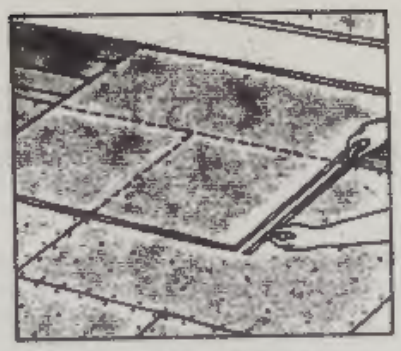
You can buy hardboard made especially for underlayment in 4-x-4-foot squares (the easiest size to work with). This special hardboard is ¼ inch thick and smooth on both sides. Or you can buy 4-x-8-foot sheets of hardboard and cut them into 4-foot squares.

Stand hardboard on edge in the room where it is to be laid for 48 hours before installing. Prepare the floor by filling gaps and cracks and sanding and nailing down loose boards. Lay ordinary hardboard with its rough side down. Lightly bevel the edges of the hardboard before nailing.

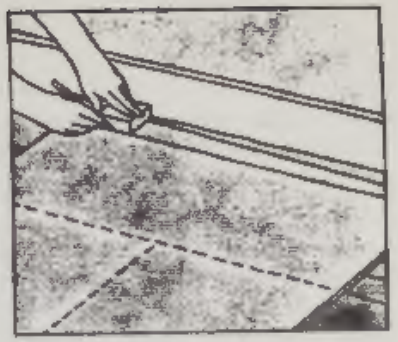


Laying hardboard squares: When putting down hardboard underlayment, try to position one edge of the first square over the center of a floor joist.

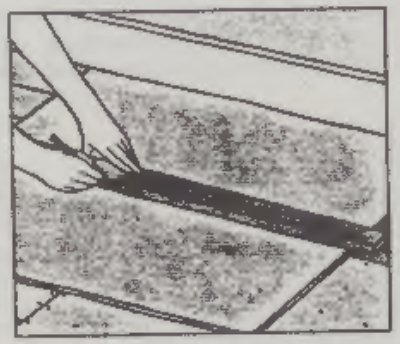
Start with a 4-ft. square in approximate center of room. Have one edge parallel to and centered on a joist.



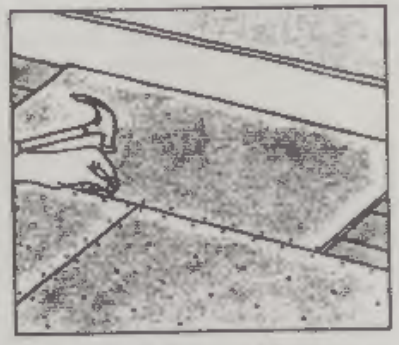
To cut border pieces flush with baseboard, place piece of hardboard flat on floor, then push it against baseboard.



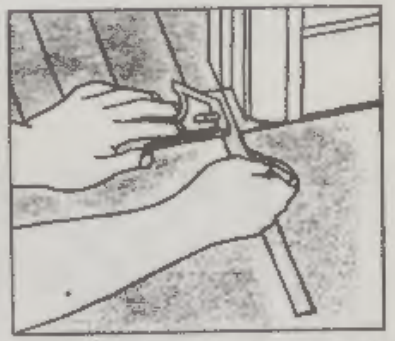
Hold a pencil against a small wood block and move block along baseboard so that pencil duplicates shape of baseboard.



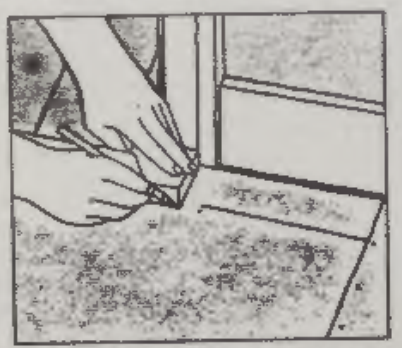
Cut along this line, then fit the hardboard against the baseboard. Mark extent of overlap of hardboard underneath.



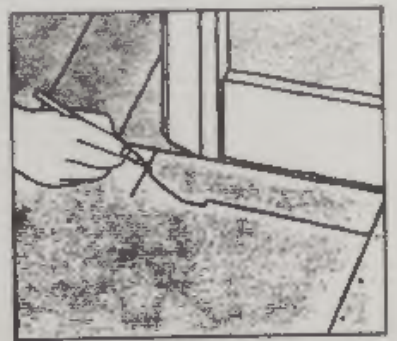
Cut off overlap; fit new section between baseboard and already laid hardboard. Do the same around entire border.



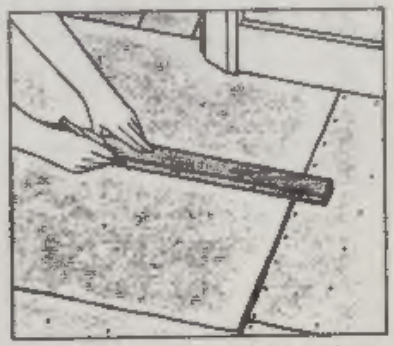
When you reach a doorway, use a combination square to mark distance from doorstop to edge of baseboard.



Use the block and pencil technique to mark the main points of the door frame on the hardboard.



Join the marked points to duplicate shape of door frame. Draw curves freehand. Cut along pencil line with coping saw.



Place cutout board in position; mark extent of overlap of adjacent nailed board. Cut and nail every 4 in.

Floor coverings

Resilient flooring

Resilient floors come in **sheet** form, such as linoleum and vinyl, and **tiles**—asphalt, vinyl, vinyl-asbestos, and cork. Except for linoleum and cork tile, most of today's resilient flooring materials can be installed anywhere in the house, including the basement.

Asphalt tile is the least expensive. However, for a few cents more per tile you can get vinyl-asbestos, which has all of asphalt tile's advantages, plus better color, easier care, and grease resistance.

More **vinyl-asbestos tile** is sold than any other kind. It can be installed anywhere, above, on, or below grade. It does not require waxing—buffing gives it a low sheen. Vinyl-asbestos tiles are made of a mixture of vinyl resins and asbestos fiber. Colors and gloss are less brilliant than in pure vinyl, but this has an advantage—scratches and soil do not show up as readily. Other maintenance characteristics are about the same as those of vinyl. Many vinyl-asbestos tiles have a vinyl-formula wearing surface fused to a vinyl-asbestos base.

Vinyl is unquestionably the most popular above-grade flooring material, and deservedly so. A good vinyl in the right pattern and color is easy to maintain. The original shiny vinyl showed scuffs and smudges, but this "plate finish," as it was called, is rarely seen today. Embossing has helped vinyl, and other tile materials, to conceal wear marks. Carved, pitted, fissured, or grained effects are more than just good-looking—they are easier to maintain. Dirt lies loosely in the recesses instead of being walked on and ground in. Texture makes even white floors almost practical, and also hides seams, floor irregularities, and dents left by furniture.

Cork tile is the only natural material among the resilient floorings. Its richness and beauty are an asset to a room, it is soft and warm underfoot, and tends to deaden the sound of footsteps. When coated with vinyl, it is easy to maintain.

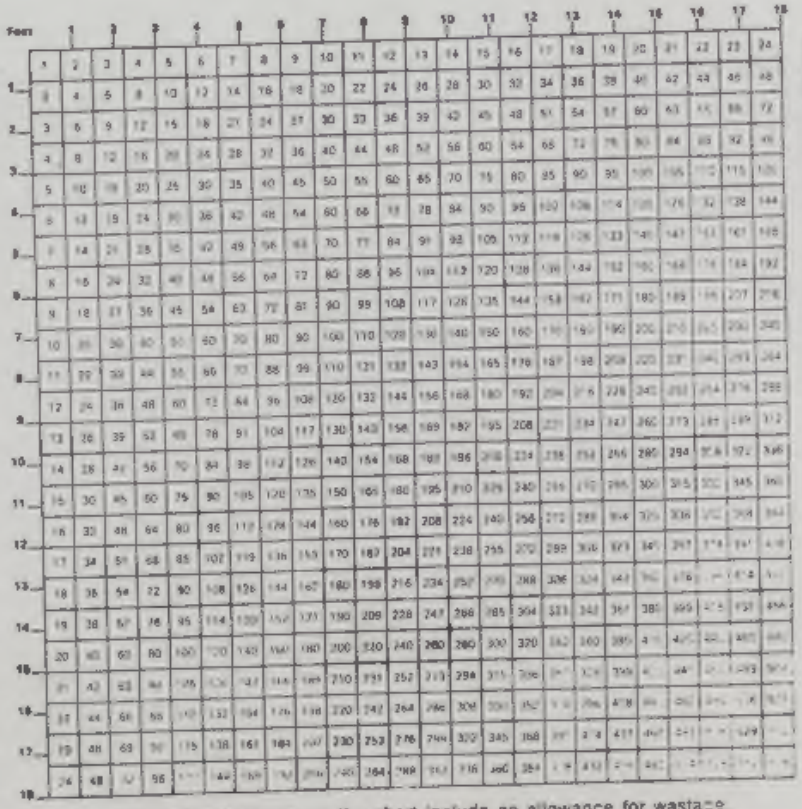
Worth a final mention are so-called "wood tiles"—a thin veneer of fine wood, such as walnut or cherry, on an asbestos base, protected by a top coat of vinyl. Like cork, these have great natural beauty. The tough vinyl surface has the added advantage of easy care. Cork and wood tiles, usually 12-inch squares, are laid much the same way as vinyl tiles.

Estimating and planning for tiling

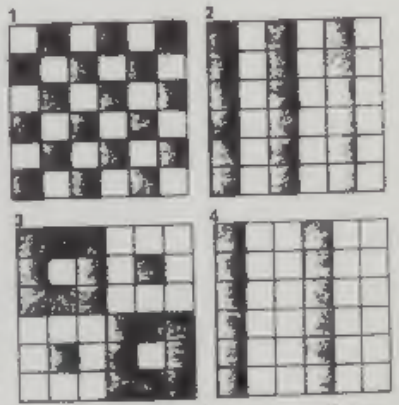
Vinyl and vinyl-asbestos tiles are 9 or 12 inches square and come in a wide variety of colors. Thickness is ⅛ or 1/16 inch. Avoid solid colors if you want easy maintenance. White and black are especially difficult. The more textures and variations in a tile, the better it will hide seams, floor irregularities, scratches, and soil. Remember, too, that some colors bleach when continuously exposed to sunlight, especially light shades, such as pinks and yellows.

To estimate the number of resilient tiles you need of one color only, first measure the length and width of the room in feet. For 12-inch tiles, you need only multiply length times width to get the number of tiles. For 9-inch tiles, find your length and width measurements on the chart and follow them across and down to the point where they intersect. The number there is the number of tiles required. For instance, you will need 252 9-inch tiles for a room 13 feet long by 10 feet wide. If a fireplace or other structure protrudes into a room, measure this obstruction separately and subtract the appropriate number of tiles. Divide irregularly shaped rooms into two or more rectangles, calculate the number of tiles needed for each, then combine the totals.

If tiles of two colors are to be laid in a checkerboard pattern or in alternate rows, halve the total amount and buy equal quantities of each color. For more complex patterns, shade in the pattern on graph paper—letting each square equal one tile—and count up the number needed of each color.



How many tiles? Totals shown on the chart include an allowance for wastage



Ratio of different-colored tiles will vary with pattern—½ of each in Nos. 1, 2, 3; ⅓ of one and ⅔ of the other in No. 4

Divide odd shapes into rectangles